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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/930,539	08/14/2001	Rodney M. LaFollette	7310.C	7186

7590

08/05/2004

Foster & Foster, LLC
Mr. Lynn G. Foster
600 E. 300 S.
Salt Lake City, UT 84102

EXAMINER

ALEJANDRO, RAYMOND

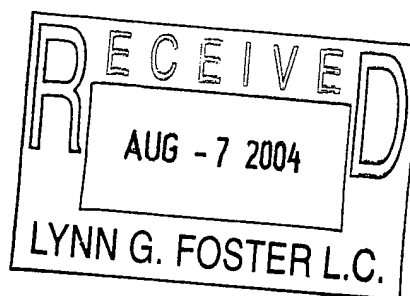
ART UNIT

PAPER NUMBER

1745

DATE MAILED: 08/05/2004

Please find below and/or attached an Office communication concerning this application or proceeding.



Office Action Summary

Application No.

09/930,539

Applicant(s)

LAFOLLETTE ET AL.

Examiner

Raymond Alejandro

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 June 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 10-43, 51-54, 89-92, 94-97 and 103-109 is/are pending in the application.
- 4a) Of the above claim(s) 10-20, 41-43, 51-54, 89-92, 94-97 and 103-109 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 21-40 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 08 November 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 08/14/01.
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: _____.

DETAILED ACTION***Election/Restrictions***

1. Applicant's election with traverse of Group I and Species 2 (claims 21-40) in the reply filed on 06/30/04 is acknowledged. The traversal is on the ground(s) that "the restriction and species requirement, in the absence of clear three-pronged proof of distinct, and nonobvious inventions and species" is not adequate. Applicants' also presented arguments addressing the following issues: "the potential harm of restriction and species requirement"; "the controlling statute requires independent and distinct inventions for a proper restriction"; "the examiner have failed to meet their prime facie burden". This is not found persuasive because the particular search for the elected claims of Group 1 (*i.e. the microfabricated battery*) classified in class 429/122 is not required for non-elected claims of Group II (*i.e. methods comprising the acts of fabricating or making microfabricated batteries*) classified in class 29/623.1, that is to say, the search required for *the microfabricated battery per se* is not particularly required for *the methods comprising the acts of fabricating or making microfabricated batteries themselves*. As admitted by the applicants, the inventive concepts involve both the battery product and the method of making the same. In addition, since the restriction requirement has been treated as process of making and product made, it is further noted that the inventions are distinct because the product as claimed can be made by another and materially different process (*as admitted by the applicants*), the battery per se can be made by etching, metallic deposition, layer lithographic patterning and the like. Accordingly, serious burden would be raised if the search of both different inventions was made as required for the separate and distinct inventions.

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2. With respect to the requirement of election of species, it is noted that as admitted by the applicant and disclosed in the specification, the present application contains multiple, several, numerous embodiments represented by the identification of species as delineated in the restriction requirement of 06/04/04. Therefore, the disclosure encompasses different and separated embodiments which are mutually exclusive. Applicant's attention is particularly directed to MPEP 809.02(a) which indicates how to identify species by illustrative figures, examples, mechanical means, particular materials, or other distinguishing characteristics.

Accordingly, serious burden would be raised if the search of such different species was made as required for the separate, distinct and mutually exclusive species.

3. It is also noted that the examiner encouraged the applicants to present reasonable claim groupings and/or election of species in accordance with the claimed subject matter to satisfactorily resolve the restriction and species requirement and because of the large number of claimed battery technologies, environments, systems and embodiments. However, applicants merely decided to traverse the restriction and species requirement without even recognizing that the claimed subject matter is, in fact, intending to cover quite a lot of battery technologies, environment, systems and embodiments from the scale-up (macrobatteries) standpoint.

4. It appears that applicants' position is that micro-battery technology (including microfabricated batteries, micro-fabrication and/or its associated matter) cannot be subjected to restriction and species election requirements because the patentability nature of the subject matter itself (i.e. the micro-scale) only asks for micro-features/systems/elements/members regardless of the specific embodiments, parts, mechanical means, or distinguishing characteristics; and/or invention relationship (e.g. process of making- product made).

The requirement is still deemed proper and is therefore made **FINAL**.

Priority

5. This application constitutes a continuation of Application No. 09/037801, filed 03/10/98.

Information Disclosure Statement

6. The information disclosure statements (IDS) submitted on 08/14/01 were considered by the examiner.

Drawings

7. The drawings were received on 11/08/02. These drawings are acceptable.

Specification

8. The preliminary amendment filed 08/14/01 does not introduce new matter into the disclosure.
9. The disclosure is objected to because of the following informalities: the current status (i.e. whether "abandoned; or patented and its patent number) of all nonprovisional parent applications referenced should be included. Appropriate correction is required.

Claim Objections

10. Claim 23 recites the limitation "the thin electrode layers" in line 2. There is insufficient antecedent basis for this limitation in the claim.
11. Claim 33 recites the limitation "the etched microfabricated electrodes" in line 8. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 112

12. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

13. Claims 21-40 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

14. The term "internal only etched spaced electrodes" in claim 21 and "of internal reactants only in the nature of separated internal microfabricated electrodes" in claim 33 is unclear and ambiguous, thereby rendering the claims indefinite. Further, the foregoing language is not defined by the claim, and the specification does not provide a standard for ascertaining the requisite degree. It is unclear as to what is particularly meant by the "internal only" limitation and its implication with respect to the final battery structure. Further clarification is required.

Claim Rejections - 35 USC § 102

15. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

16. Claims 21-31, 33-36 and 38-40 are rejected under 35 U.S.C. 102(b) as being anticipated by Bates et al 5455126.

The instant claims are directed to a microfabricated battery wherein the disclosed inventive concept is the micro-nature of the battery.

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Regarding claims 21 and 33:

Bates et al disclose a thin-film micro-battery, and a method for making same having applications as a primary integrated power source of electronic devices (ABSTRACT/col 2, line 64 to col 3, line 1). *Thus, it is a microfabricated battery.* Bates et al disclose that the thin-film battery comprises a cathode layer, an electrolyte layer and an anode layer (COL 3, lines 2-8). The battery is rechargeable (COL 3, lines 31-35). It is disclosed that the deposition of thin films places the anode close to the cathode. This is because the transport of ions is easier and faster in film layers (COL 2, lines 20-25). *Thus, the micro-battery provides spaced electrodes containing electrode reaction accommodating electrolyte between the electrodes.* Bates et al further disclose that a battery is one of two kinds of electrochemical devices that convert the energy released in chemical reaction directly into electrical energy (col 1, lines 40-43). It is disclosed that micro-cell occupies an area of 1 square centimeter (COL 3, lines 39-42). *Thus, its footprint is less than 20 cm².*

It is disclosed that similarly, a cathode is deposited as a 1 micron thick film over the larger current collector; an electrolyte film is then deposited over the cathode (col 3, lines 60-67); the electrolyte film has a thickness of 1 micron (col 4, lines 5-7); then, a deposition of a film (anode) over the electrolyte film the intervening substrate and the smaller current collector completes the cell (col 4, lines 10-16).

Bates et al reveals that it is configured as a microbattery, the battery can be fabricated directly onto a semiconductor chip, onto the semiconductor die or onto any portion of the chip carrier. The battery is fabricated of solid state materials (ABSTRACT). It is further disclosed that

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the batteries can be scaled down for microelectronics applications, a size that frequently is many times larger than the semiconductor chip on which they are used (col 2, lines 9-11).

Bates et also discloses the fabricating technique may include rf or dc magnetron sputtering, or diode sputtering (COL 3, lines 52-56) or cold pressing (COL 4, lines 3-5) or lithographic techniques (COL 2, lines 17-20). *Thus, it is noted that any of these fabrication techniques is capable of producing a patterned or designed material by eating into the material surface as required by action of etching. Thus, the electrodes are etched.*

Examiner's note: *as to the limitations: a) "adapted for direct and congruent size integrating with microelectromechanical systems and/or microcircuitry to reduce power losses", or b) "for direct size and electronic integrating into a microelectrochemomechanical system or non-microelectrochemomechanical system microcircuit to alleviate power losses", it is contended that this limitation does not distinguish over prior art because the recitation that an element/feature/member is "adapted to (for)" perform(ing) a function is not a positive limitation but only requires the ability to so perform.*

As to claims 22 and 39-40:

Bates et al disclose that the thin-film battery comprises a cathode layer, an electrolyte layer and an anode layer (COL 3, lines 2-8). *Thus, the electrolyte layer acts as the separator associated with the electrolyte interposed between both electrodes.*

Regarding claims 23 and 34:

Bates et al disclose that the thin-film battery comprises a cathode layer, and an anode layer (COL 3, lines 2-8). It is disclosed that the deposition of thin films places the anode close to the cathode. This is because the transport of ions is easier and faster in film layers (COL 2, lines

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20-25). It is also disclosed the use of current collectors as part of the electrode structure (COL 3, lines 2-8/COL 3, lines 49-55). *Thus, the electrode layers are conductive.*

With respect to claim 24:

Bates et al disclose lithium-film batteries (COL 1, lines 15-20). *Accordingly, such lithium-based batteries must be sealed so as to prevent the inclusion or aggregation of foreign substances into the cell per se. Thus, the sealed limitation is inherent thereto.*

On the matter of claims 25-26:

Bates et al reveals the formation of thin-film batteries (COL 1, lines 15-20). It is also disclosed that it is configured as a microbattery, and the battery can be fabricated directly onto a semiconductor chip, onto the semiconductor die or onto any portion of the chip carrier. *Thus, thin batteries stand for flat cells as well as having the battery fabricated onto the semiconductor chip implies having the battery attached thereto (peg in a block). In addition, battery geometries including: the flat cell, spirally wound, bipolar and linear; and wire-shaped, odd-shaped; wire in a can; peg in a block encompasses a very large number of possible permutations of battery configurations.*

As far as claims 27-29:

Bates et al discloses that battery may use lead, cadmium (COL 1, lines 57-60); as well as lithium as electrode active materials (COL 3, lines 38-42).

Concerning claims 30-31:

The battery is fabricated of solid state materials (ABSTRACT) or by having a vitreous electrolyte film/layer (COL 4, lines 10-15/ COL 3, lines 2-8). *Thus, the electrolyte is solid.* In addition, Bates et al also disclosed the use of lithium phosphate, phosphosilicate and/or

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phosphorous oxynitride electrolyte films (SEE TABLE 1/ COL 3, lines 2-8). *These are lithium-based vitreous materials.*

As to claims 35-36:

Bates et al further reveals the use of substrate such as glass, alumina, sapphire or various semiconductor or polymer materials (COL 3, lines 2-5/ COL 3, lines 49-55). *Some of these materials exhibit poor conductivity, and are either conformal materials or rigid materials.*

With reference to claim 38:

Bates et also discloses the fabricating technique may include rf or dc magnetron sputtering, or diode sputtering (COL 3, lines 52-56) or cold pressing (COL 4, lines 3-5) or lithographic techniques (COL 2, lines 17-20). *Thus, it is noted that any of these fabrication techniques is capable of producing a patterned or designed material by eating into the material surface as required by action of etching. Thus, the electrodes are etched.*

Therefore, Bates et al anticipates the above-mentioned claims.

Claim Rejections - 35 USC § 103

17. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

18. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any

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evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

19. Claims 26-28, 32 and 37 are rejected and/or further rejected under 35 U.S.C. 103(a) as being unpatentable over Bates et al 5455126 as applied to claim 30 above, and further in view of Miekka et al 6045942

Bates et al are applied, argued and incorporated herein for the reasons above.

In addition, Bates et al disclose the use of acid electrolytes (COL 1, lines 58-62). It is also disclosed that the performance of thin-film batteries is critically limited by the properties of the chosen electrolyte (col 4, lines 33-37).

However, Bates et al does not expressly disclose the specific liquid electrolyte material, the specific electrolyte influent flow path. In addition, Bates et al does not expressly disclose other battery geometries, and electrode materials.

As for claim 26:

Miekka et al disclose that the electrolyte solution may be maintained in a sealed container such as bag or enclosure (COL 6, lines 20-25).

Concerning claims 27-28:

Miekka et al also disclose electrode materials such as cupric oxide, silver oxide, nickel oxide, and zinc (COL 4, lines 1-10).

As to claims 32 and 37:

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Miekka et al discloses a ultra thin battery construction along with a method for making same (ABSTRACT). Miekka et al disclose the addition of appropriate aqueous electrolyte (ABSTRACT) by rupturing the enclosure causing the electrolyte solution to migrate by wicking action (COL 6, lines 23-31). It is also discloses the presence of gap substantially filled with an aqueous solution (COL 2, lines 24-33). *Thus, Miekka et al envision an electrolyte influent flow path.* Miekka et al also disclose that the aqueous electrolyte is chosen based on the overall chemistry required by the battery and may include an aqueous solution of an acid, base or a salt (COL 4, lines 8-11), particularly, the aqueous electrolyte may be either potassium hydroxide (COL 3, lines 59-60).

In view of the above, it would have been obvious to one skilled in the art at the time the invention was made to use the specific liquid electrolyte material and the specific electrolyte influent flow path of Miekka et al in the thin-film battery of Bates et al as Miekka et al teach that the specific aqueous electrolyte is chosen based on the overall chemistry required by the battery and which cooperatively participate to produce the desired electrochemical reaction. In addition, the specific electrolyte influent flow path is required to make the battery operational, and it may be employed with other battery embodiments as will be appreciated by those of skill in the art, including may of the battery embodiments disclosed therein.

As to the specific electrode materials, it would have been obvious to one skilled in the art at the time the invention was made to use the specific electrode materials of Miekka et al in the thin-film battery of Bates et al as Miekka et al teach that it would be readily appreciated that the active electrode material are such materials or combinations thereof which cooperatively participate to produce the desired electrochemical reaction, wherein the cathode electrode

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includes a material which acts in the overall system as an oxidizing agent and the anode electrode includes an active material that is easily oxide an thus functions as an available source of electrons, and thus, the claimed electrode materials exhibit the afore-mentioned properties.

As to the specific battery geometry, it would have been obvious to one skilled in the art at the time the invention was made to use the specific battery geometry of Miekka et al in the thin-film battery of Bates et al as Miekka et al teach that the anode to cathode electrode geometry may take one of many forms for ease manufacturing. Thus, Miekka et al envision varied battery geometry so as to improve manufacturing thereof.

It is also noted that Bates et al and Miekka et al are pertinent to each other as well as to applicant's invention as they both share the same field of endeavor of providing working functional thin-film micro-sized batteries.

Response to Arguments

20. Applicant's arguments with respect to claims 21-40 have been considered but are moot in view of the new ground(s) of rejection. In this regard, it is noted that applicants presented a declaration dated 12/17/02 to address several unresolved issues of and references cited in prior office actions of its related parent application. Accordingly, such declaration has been fully considered.

21. Nevertheless, upon examination of the declaration, the examiner noted that its closing page 19 was not signed. However, applicant submitted an additional page 17 containing applicant's signature and thus, an indication that the declaration was fully executed. Applicant is advised that for practical purposes the examiner has accepted the declaration and has no intention

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to discredit it. Nonetheless, for purpose of prosecution and reasons of record, applicant is requested to submit a clarifying statement and/or a substitute declaration obviating such minor informalities. This is done to avoid any confusion which might arise due to the improper matching of specific corresponding page numbers and to further elucidate that applicant did intend to sign the declaration of 12/17/02 containing 19 pages in total, and not a secondary and/or additional declaration/document containing only 17 pages in total. Applicant's cooperation to satisfactorily resolve this issue is requested.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Raymond Alejandro whose telephone number is (571) 272-1282. The examiner can normally be reached on Monday-Thursday (8:00 am - 6:30 pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick J. Ryan can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Raymond Alejandro



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Examiner

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A handwritten signature in black ink, appearing to be 'RAM', with a long horizontal line extending from the end of the signature.